



BIO-SCALE

BIO-SCALE is an effective and efficient heat transfer system cleaner designed to remove encrusted lime scale, rust and corrosion products from water-wetted surfaces.

- BIO-SCALE is non-toxic, non-hazardous and biodegradable.
- BIO-SCALE is non-acid and does not require neutralization.
- BIO-SCALE operates in a pH range from 6.0 to 8.5 and can be safely disposed of in municipal water handling operations.

BIO-SCALE is non-corrosive and will not adversely affect the following materials: stainless steel, carbon steel, brass, admiralty metal, copper, iron, lead, aluminum, PVC plastic, polyethylene, rubber, leather, or any metal or material normally found in water-wetted equipment.

BIO-SCALE may adversely affect materials containing magnesium or zinc. These material should be tested to ascertain the concentration, temperature and time effects before treatment with BIO-SCALE. It is recommended that treatment be at a concentration of less than 2 percent, a temperature not over 14°F and for less than 2 hours to prevent etching.



APPLICATION -

BIO-SCALE cleans by chemically tying up the multivalent metal ions in solution. The time required for any given application will depend upon the temperature available, the concentration of the BIO-SCALE solution and the quantity of scale, rust and corrosion present.

BIO-SCALE solution is more effectively used by circulating it through the equipment to be cleaned. When possible, circulation should be up flow to assure all the internal surface is covered.

Since every application is different, it is difficult to provide a detailed procedure for the cleaning operation, but most applications have a number of steps in common.

1. The equipment to be cleaned (compressor, heat exchanger, pump filter system, boiler, etc.) should be shut down, drained and a visual inspection made to certain the amount of scale deposits present. Consult the concentration guide for the approximate concentration of BIO-SCALE to be used.
2. The equipment should be closed, filled with clean water and backlashed for 10 minutes to remove as much loose scale and debris as possible. The equipment should then be completely drained of all water.
3. A BIO-SCALE solution of appropriate strength (from concentration selection guide) should be added to the system and circulated while bringing the solution to the desired temperature (100°F-180°F).
4. Circulation should continue for two to eight hours depending on the quantity and composition of the scale to be removed. Inspection on 2 hour intervals should give you some guidance as to the appropriate length of time required.
5. When the cleaning solution is spent and scale is still present, repeat the cleaning process.
6. There will normally be a slight odor of ammonia as the BIO-SCALE solution is spent. The pH of the solution should also rise to about 8.0. However, if the pH of the water used to make the cleaning solution was very low, the solution could become spent without reaching a pH of 8.0. Visual inspection is the best method of judging the completion of the process.
7. When the cleaning process is complete, drain the system and flush with fresh water before returning equipment to service.



BIO-SCALE is designed to safely remove lime scale and corrosion from a broad variety of industrial operations:

- All types of power plant boilers and piping systems including nuclear power plants.
- Equipment in refineries, utility companies, paper mills, chemical plants, foundries and other industries.
- Sewage disposal plants, water treating facilities and other municipal water handling operations.
- Compressor stations and radiator systems of all types including closed loop cooling systems.
- Any equipment that is water cooled in any manner or that requires the removal of multivalent metal ions.
- Applications in office buildings, hospitals and electronic facilities where accidental spills or leaks could result in adverse effects.
- Any cleaning application requiring a solution with an extremely low metal ion content.

PHYSICAL PROPERTIES

APPEARANCE	-	BLUE GREEN COLOR PLEASANT ODOR
SPECIFIC GRAVITY	-	1.06
BOILING POINT	-	214°F
FREEZING POINT	-	15°F
FLASH POINT	-	NONE



BIO-SCALE CONCENTRATION SELECTION GUIDE

SCALE THICKNESS

BIO-SCALE CONCENTRATION (% BIO-SCALE IN WATER)

1/16"	5%
1/8"	10%
1/4"	15%
1/2"	20%
1"	25%*

*May require multiple cleanings.

CLEANING TIME

Cleaning time depends on many factors, including scale composition, solution temperature, solution concentration, thickness of deposits, surface area to volume ratio, agitation and recirculation rate. For this reason, only approximate times can be given.

SOLUTION TEMPERATURE

APPROXIMATE CLEANING TIME

100°F	24+ HOURS
125°F	16-24 HOURS
150°F	8-16 HOURS
175°F	4-8 HOURS
200°F	2-4 HOURS

BIO-SCALE can be used in a number of other applications such as on line cleaning and metal surface treatment to prevent corrosion. consult with your Pan American technical representative for additional information.